

Family Environmental Fun Pack

Trees of Celery Bog Nature Area

A project of EDCI 506,
Environmental Education

Professor: Daniel P. Shepardson
Department of
Curriculum and Instruction
Purdue University



*In cooperation with
West Lafayette Parks and Recreation*

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*Supported by a Purdue University service
learning grant from the Office of Engagement*

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The Family Environmental Fun Packs

The following Family Environmental Fun Packs are available for checkout from the Lilly Nature Center. It may require several visits to complete all of the activities in a pack.

Nature Drawing: Families explore Celery Bog Nature Area through observing and drawing the trees, wildlife, and landscapes of Celery Bog, learning simple drawing techniques. Families visit three different sites; requires about one hour per site.

The Scoop on Soils: Families explore the soils of Celery Bog Nature Area using soil science tools and techniques, learning about wetland and woodland soils. Families visit three different sites; requires about one hour per site.

Trees of Celery Bog: Families explore the trees of Celery Bog Nature Area using forestry tools and techniques, learning about sugar maples, black cherry, tulip and other trees that grow in the Celery Bog Nature Area. Families visit three different sites; requires about one hour per site.

Please return the pack to the Lilly Nature Center

Please stay on the trails unless completing an activity

Trees of Celery Bog

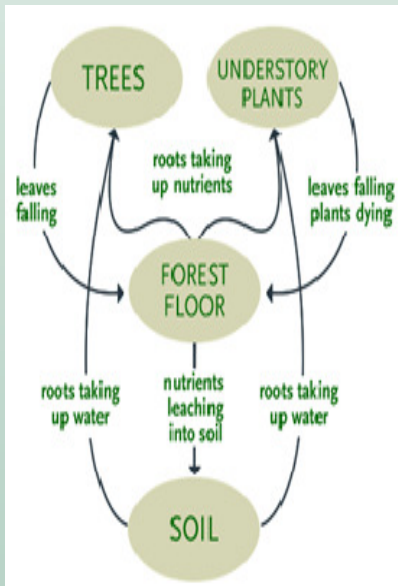
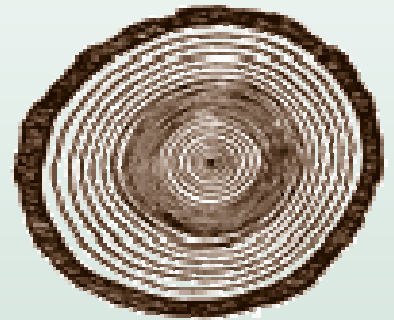


OBJECTIVES

- Families will identify several common trees found in Celery Bog Nature Area.
- Families will use forestry tools and techniques to measure different tree characteristics.
- Families will analyze the relationships between different trees and tree growth.

OVERVIEW

Foresters use scientific tools and techniques to measure trees. By learning to use these forestry tools and techniques you will investigate the trees of Celery Bog Nature Area. Personal connections to the natural world will be developed as you identify and measure the trees of Celery Bog Nature Area.



BACKGROUND

Trees are an important part of an ecosystem. They provide homes (shelter) for many animals such as squirrels, insects, and birds. Trees also provide food—seeds, nuts and sap—for many animals; their leaves are also eaten by insects and deer. Trees provide shade and help to cool the ground. Finally, they produce oxygen. Some trees are valued for their beauty and others are valued for their wood. Many different kinds, or species, of trees grow in the Celery Bog Nature Area. Oak, hickory, maple, beech, black cherry, walnut, tulip, and box elder are a few of the different kinds of trees that may be found here. Not only do these different types of trees grow in different areas of Celery Bog, but they also grow at different rates. As trees age, they grow both taller and wider, but at different rates depending on the species. Foresters often measure trees to collect data about their growth and health so as to better manage the forest. In this learning experience, your family will use forestry tools and techniques to investigate different trees that grow in the Celery Bog Nature Area.

Ages: Upper elementary through adult

Trees of Celery Bog

Site Map



MATERIALS

Check for the following items in the backpack before starting:

- ✓ Tree field guide
- ✓ Tape measure
- ✓ Tangent gauge
- ✓ Diameter tape
- ✓ Clipboard
- ✓ Drawing paper
- ✓ Magnifying glass
- ✓ Record sheet



Safety Note!

Avoid poison ivy. Not only does it grow on the ground but it also vines up on trees: you can get a rash even when the leaves are off.

Wear proper clothing and protect yourself from mosquitoes, chiggers, and ticks by using bug spray.



ACTIONS

1. Follow the Site Map, hike to Site #1 with the “Tree” backpack.
2. Complete the activities for Site #1. You should allow about an hour to complete the activities.
3. Continue to Site #2 and complete the activities for Site #2. You should allow about an hour to complete the activities.
4. Continue to Site #3 and complete the activities for Site #3. You should allow about a half-hour to complete the activity.



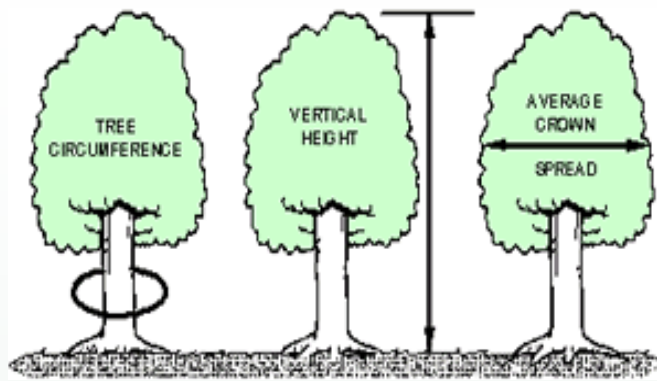
SITE 1. SUGAR MAPLES

This group (stand) of trees is mostly made up of sugar maples of various height, diameter, and age. Different ages and types of trees have different bark.

Use the tree guide and find a tall sugar maple to serve as your parent tree. Observe and draw the tree's bark, note any patterns, colors, texture, and other characteristics. Now find a small sugar maple (about 5 feet tall) that is near your tall sugar maple. Observe and draw the bark, note any patterns, colors, texture, and other characteristics.

Think about it

- ◆ How does the small (younger) sugar maple's bark compare to the tall (older) sugar maple's bark?



Measuring Height

Using the tangent gauge and tape measure, calculate the height of the tall and small sugar maples. Follow the procedures listed on the side of the tangent gauge. Select another tall and small sugar maple and calculate their height. Record your measurements in the table below.



Measuring Diameter

Use the diameter tape to measure the diameter of the tall and small sugar maples you measured in the previous task. Record your measurements. To measure diameter, wrap the diameter tape around the main stem (trunk) at 4 1/2 feet (adult breast height) above the ground. Foresters refer to this as the diameter at breast height, or DBH. Be sure the tape is pulled tight and read the tape where the start (zero) line overlaps with the tape. Small trees, usually between 2 and 4 inches DBH are called saplings. Trees smaller than 2 inches are called seedlings.



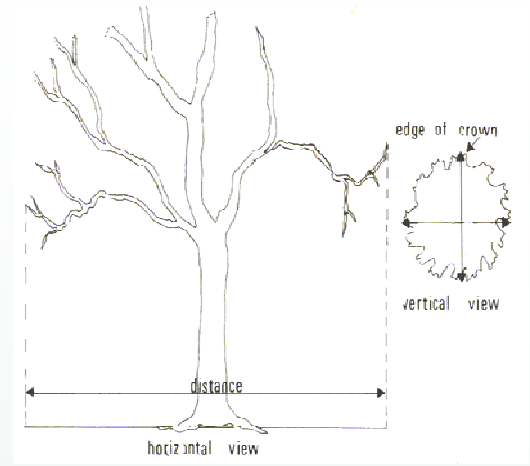
	Tall Sugar Maple #1	Tall Sugar Maple #2	Small Sugar Maple #1	Small Sugar Maple #2
Height				
Diameter				

Think about it

- ♦ What is the relationship between the height of the tree and its diameter?
- ♦ How would you explain this relationship?

Measuring Crown Spread

Determine the crown spread for your tall and small sugar maples. Crown spread is how far the branches spread away from the trunk. To measure crown spread, you will measure the distance between the branches that extend farthest from the trunk on opposite sides of the tree. Calculate an average of these two measurements to determine the crown spread.



	Distance 1	Distance 2	Crown Spread (Average)
Tall Sugar Maple			
Small Sugar Maple			

Think about it

- ♦ What is the relationship between the height of the tree and crown spread?
- ♦ How might the size of a tree's crown spread impact the surrounding environment?
- ♦ How might the size of a tree's crown spread affect the growth of other trees?

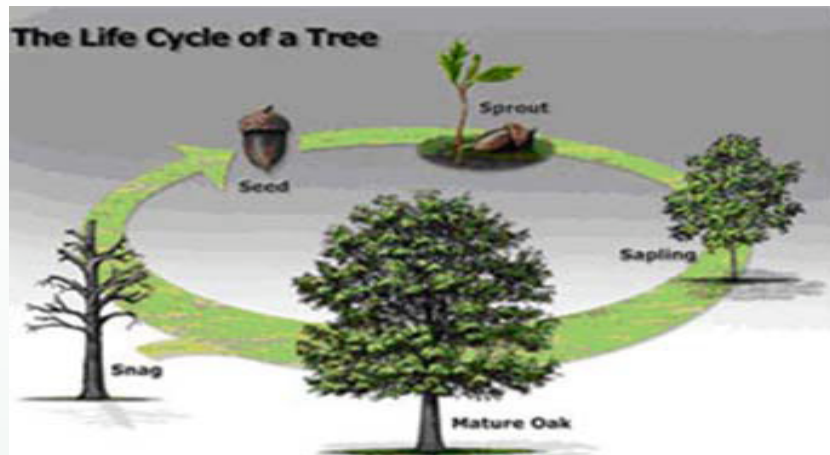
Measuring Distance between Sugar Maples

Use the measuring tape and measure the distance from your parent sugar maple to the nearest tall sugar maple that is similar in height. Now measure the distance from your parent sugar maple to the nearest small sugar maple

	Distance Tall Sugar Maple	Distance Small Sugar Maple
Parent Sugar Maple		

Think about it

- ♦ Why do you think the tall sugar maples are farther from your parent tree than the smaller sugar maples?
- ♦ When your tall sugar maple dies what do you think will happen to the nearest small sugar maple?
- ♦ How might the crown spread of your tall sugar maple affect the growth of the small sugar maple?



As you hike to Site 2 observe how the landscape, or topography, changes. Site 2 is just off the main trail near the rock piles.

SITE 2. BLACK CHERRY, TULIP, AND SUGAR MAPLE SAPLINGS

This stand of trees is primarily made up of black cherry, tulip and sugar maples of various height, diameter, and age.

Use the tree guide and find a tall black cherry and a tall tulip tree to serve as your parent trees. Observe and draw each tree's bark; note any patterns, colors, texture, and other characteristics.



Think about it

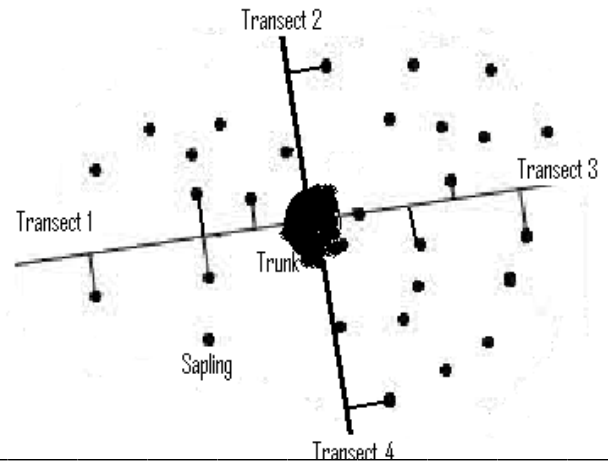
- ♦ How does the bark of the black cherry compare to the bark of the tulip tree?
- ♦ How does the bark of the black cherry and tulip compare to the bark of the sugar maple?



Black cherry trees can reach a height of 80 feet. Tulip trees (often called "yellow poplar") are among the fastest growing and tallest trees found in Celery Bog. Tulip trees can reach a height of 200 feet. The tulip's greenish-yellow flowers are tulip-shaped, giving the tree its "tulip" name. The tulip tree is the state tree of Indiana.

Transect Example

There are 4 saplings along transects 1 and 3. There are 2 saplings along transects 2 and 4. Saplings further than 3 feet from the transect are not counted.



Conducting a Line Transect: Counting Saplings

Saplings are small trees, usually between 2 and 4 inches at DBH. In this activity, you are going to count the black cherry, tulip, and sugar maple saplings found along eight line transects. A line transect is a straight line that cross-sections (i.e., transverses) an area along which measurements are taken at specified distances (intervals). It is a technique used to sample the vegetation in an area. Transects are used by foresters and ecologists to monitor the vegetation in an area and to determine the health of the forest.

You will run four line transects from the black cherry and four line transects from the tulip trees you identified earlier. Each transect will run from the side of the trunk of each parent tree for 30 feet. At intervals of 3 feet, you will count the number of black cherry, tulip, and sugar maple saplings that are within 3 feet of the point on the transect. Record your findings in the table. Use the measuring tape to layout the line transect and to identify the 3 foot intervals (i.e., 3, 6, 9, 12, 15, 18, 21, 24, 27, and 30 feet).

Black Cherry Transects; Total Number of Saplings

	Transect 1	Transect 2	Transect 3	Transect 4	Total
Black Cherry Saplings					
Tulip Saplings					
Sugar Maple Saplings					

Tulip Transects; Total Number of Saplings

	Transect 1	Transect 2	Transect 3	Transect 4	Total
Black Cherry Saplings					
Tulip Saplings					
Sugar Maple Saplings					

Think about it

- What is the most abundant sapling surrounding the black cherry?
- What is the most abundant sapling surrounding the tulip?
- What is the most abundant sapling found in the area?
- How would you explain this result?
- How might the environmental factors or conditions (sun light, water, soil) at this site impact sapling growth?

SITE 3. WHICH TREES ARE FOUND HERE?

At sites 1 and 2 you observed and measured sugar maple, black cherry, and tulip trees. These trees are adapted to survive in those locations. As you observe the trees at this site, you will notice different trees; trees not found at Sites 1 and 2.

Observe the environmental factors or condition (sun light, soil, water) of the site. How does this site differ from Sites 1 and 2? Think about how the environmental factors of the site might impact the type and number of trees that can survive at this site.

Use the tree identification book and count the number of different tree species you can identify. Record the trees and indicate the number of trees observed.



Trees Identified	Number of Trees Observed

Think about it

- Which tree species are most suited to survive at this site?
- How many sugar maples, tulips, or black cherry trees did you find?
- How might the environmental factors of an area affect which species of trees can survive?



History of Celery Bog Nature Area

More than 16,000 years ago retreating glaciers created the basin which led to the formation of Celery Bog. Over the course of thousands of years, this area has experienced many transitions through various ecological communities, including once functioning as a type of wetland called a bog.



Celery Bog was converted to farmland in the 20th century (1900s). Celery as well as other crops were grown in the rich peat of the drained wetland. In order to farm the wetland, the water had to be drained using tile drains. Tile drains are porous pipes that allow water within the soil to enter and flow out through the pipes. This prevents the soil from becoming waterlogged. This agricultural drainage system, however, constantly failed and resulted in the termination of farming in the wetland. Over time, the farmland gradually reverted back to wetland conditions, and now closely resembles a marsh ecosystem.

The wetland and surrounding area are now preserved as the Celery Bog Nature Area. As a wetland, it serves several important functions. First, it acts as a sponge to soak up water, reducing floods and recharging the ground water. Secondly, it filters pollutants and traps sediments, improving water quality; and thirdly it provides habitat for countless wildlife species.

Celery Bog Nature Area offers year round opportunities for families to experience the local ecological communities that are being restored and managed within the park. Nature trails wind through the area, providing for close observation and appreciation of the trees and wildlife of the Midwest.

Additional information about Celery Bog Nature Area
and West Lafayette Parks and Recreation
may be found at the following websites:

www.purdue.edu/eas/geomorph/research/celerybog/homepage.html

www.westlafayette.in.gov/parks

Record Sheet

Measuring Height and Diameter

	Tall Sugar Maple #1	Tall Sugar Maple #2	Small Sugar Maple #1	Small Sugar Maple #2
Height				
Diameter				

Measuring Crown Spread

	Distance 1	Distance 2	Crown Spread (Average)
Tall Sugar Maple			
Small Sugar Maple			

Measuring Distance between Sugar Maples

	Distance Tall Sugar Maple	Distance Small Sugar Maple
Parent Sugar Maple		

Conducting a Line Transect: Counting Saplings

Black Cherry Transects; Total Number of Saplings

	Transect 1	Transect 2	Transect 3	Transect 4	Total
Black Cherry Saplings					
Tulip Saplings					
Sugar Maple Saplings					

Tulip Transects; Total Number of Saplings

	Transect 1	Transect 2	Transect 3	Transect 4	Total
Black cherry saplings					
Tulip saplings					
Sugar maple saplings					

What trees are found here?

Trees Identified	Number of Trees Observed